THE PREDICTIVE POWER OF THE MIP SCOREBOARD'S INDICATORS

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Motivation

- **The aim is to perform an in-depth ex-post analysis of the indicators included in the MIP Scoreboard.**

  - Testing the crisis **prediction ability of the MIP** Scoreboard's indicators

  - We **evaluate** the official thresholds and **estimate** their optimal value

  - Impact of **statistical data revisions**

Macroeconomic Imbalance

- The European Commission (European Commission, 2016, p.31):

  "Trends or states that could jeopardize macroeconomic stability if not corrected."

  - some types of crises are already covered by EU mechanisms (public debt crisis – SGP, financial or banking crisis – ESRB and ECB; external debt crisis – EFSF, ESM)

  - we utilized the **output gap** because it accounts for the development of the business cycle, has the potential to capture real economy crisis events

Crisis Events Frequency
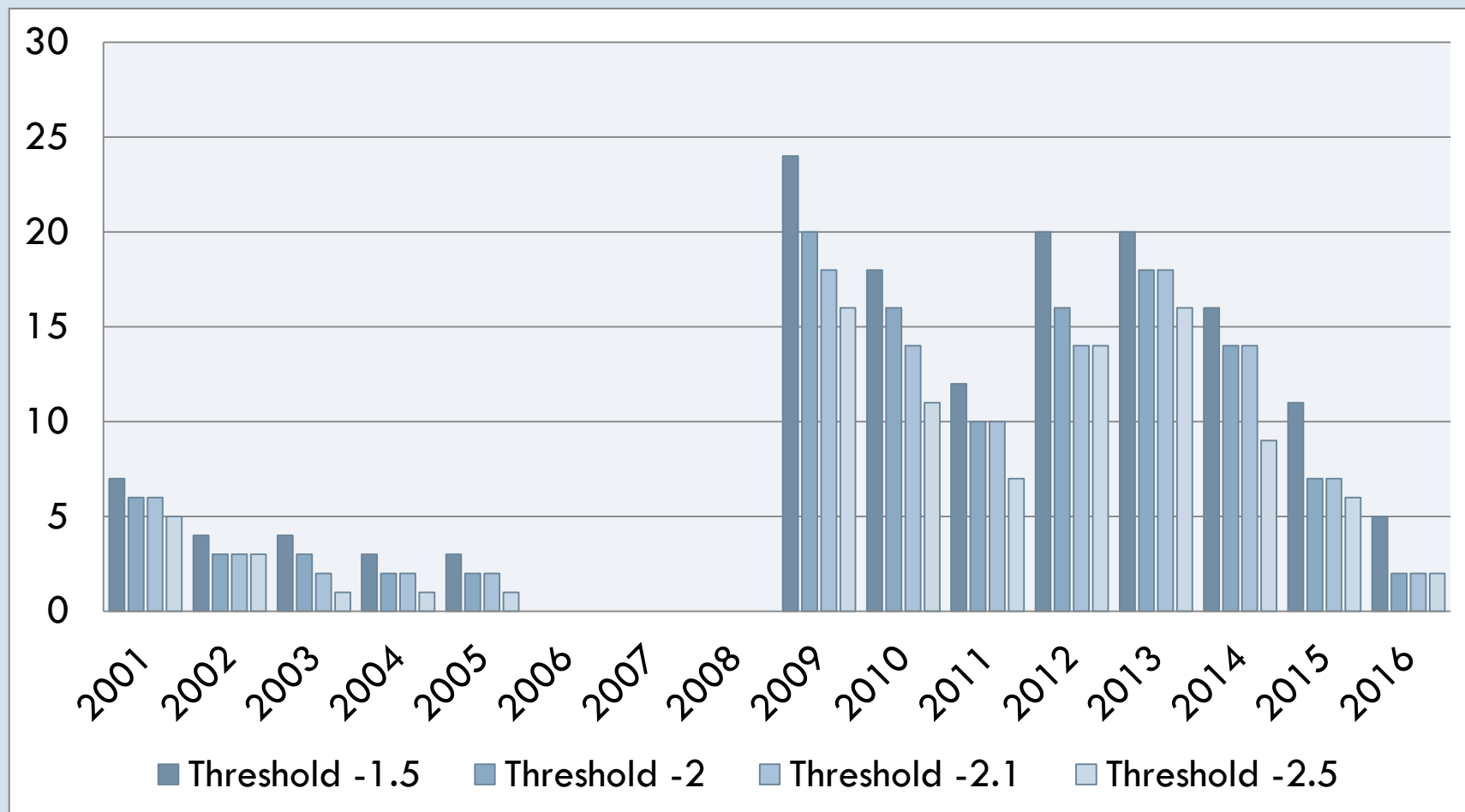
MIP Scoreboard Structure

External imbalances and competitiveness		Indicative thresholds
Current account balance	% of GDP, 3 year backward moving average	+6% and -4%
Net international investment position	% of GDP	-35%
Real effective exchange rate	42 trading partners, HICP deflator, 3 years % change	±5% (EA), ±11 (non-EA)
Export market share	% of world exports, 5 years % change	-6%
Nominal unit labour cost	2010=100, 3 years % change	9% (EA), 12% (non-EA)
Internal imbalances		
House price index	deflated, 1 year % change	6%
Private sector debt	consolidated, % of GDP	133% (previously 160%)
Private sector credit flow	consolidated, % of GDP	14% (previously 15%)
General government gross debt	% of GDP	60%
Unemployment rate	3 year backward moving average	10%
Total financial sector liabilities	non-consolidated, 1 year % change	16.5%
New employment indicators		
Activity rate	% of total population aged 15-64, 3 years change	-0.2 p.p.
Long-term unemployment rate	% of active population aged 15-74, 3 years change	0.5 p.p.
Youth unemployment rate	% of active population aged 15-24, 3 years change	2.0 p.p.

Source: European Commission, 2015c.

Data and Methodology

□ We test the crisis prediction ability of the indicators

  □ **separately**

   ◼ **signals approach** (Kaminsky, Lizando and Reinhard, 1998),

   ◼ **loss and usefulness function** of the policymaker (Alessi and Detken, 2011)

  □ as **one system by estimating limited dependent variable models** (treatment of the MIP as one system) / Kamps' critique (2013 and 2014)

   ◼ LPM, Logit, Probit and Indicator model

   ◼ pooled, FE, RE, Chamberlain's, Dynamic, Multinomial model

   ◼ prediction performance was evaluated by AUROC (Candelon, Dumitrescu and Hurlin, 2012)

Database

- **Eurostat and EC data** were used and all the indicators (scoreboard + auxiliary) were taken into consideration in order to replicate the MIP decision making process as much as possible;

- different time windows for crisis prediction (1-3 years);

- we distinguished between **EA** countries and **non-EA** countries by time of their accession;

- we distinguished three **time intervals**
  - 2001-2008
  - 2001-2012
  - 2001-2016

Results

- **all years of available** data - rather <u>highly</u> reliable predictions of future output gap drops

- the **out-of-sample results** - relatively <u>less</u> reliable (but far from uninformative)

- **restricted sample** in order to predict 2009 drop - very close or not better than a <u>random model</u>

- if the MIP had been **employed before the 2009** recession - moderately useful alerts, mostly applied to the **EA countries** and for only few indicators (EMS, REER, PrSD, AR)

Policy Recommendation

- the analysis has also supported the notion that
  - **financial sector variables** might <u>not be the best choice </u>in regard to real business cycles (except Private sector debt)
  - **external sector** indicators seem <u>more appropriate </u>but possibly more susceptible to statistical biases (EMS short, NULC long)
  - **labor market indicator** can perform exceptionally <u>well in short to mid term </u>predictions (youth UR, long-term UR)

- regarding the **nature of the indicators** (level vs. relative change) **-** the official thresholds expressed in relative changes might be very close to optimal values

- **data revisions** might have significant effect on the results in case of several indicators from predominantly external sector – yet, no systemic error identified

Policy Recommendations

- The performance of the variables can be increased by **updating their thresholds e.g.**
  - Current account
    - EA – stricter (-2 and -1.1)
    - Non-EA – less strict (-12.8 and -10.1)
    - Upper threshold perform for the EA worse then a random model
  - General government debt
    - EA – less strict (around 108)
    - Non-EA – stricter (28 and 69)
  - Differentiation of the thresholds based on economic conditions (Knedlik, 2014)

Thank you for your attention!

More details:

1. DOMONKOS, Tomáš - OSTRIHOŇ, Filip - ŠIKULOVÁ, Ivana - ŠIRAŇOVÁ, Mária. Analysing the Relevance and Predictive Power of the MIP Scoreboard's Indicators : FIRSTRUN *Working paper on the MIP Scoreboard* .

2. DOMONKOS, Tomáš - OSTRIHOŇ, Filip - ŠIKULOVÁ, Ivana - ŠIRAŇOVÁ, Mária. Analysing the Relevance of the MIP Scoreboard's Indicators. In *National Institute Economic Review* : Journal of the National Institute of Economic and Social Research, 2017, no. 239, p. R32-R52.

3. SIRANOVA, M. - RADVANSKY, M. (2017). Performance of the Macroeconomic imbalance procedure in light of historical experience in CEE region. In *Journal of Economic Policy Reform*, 1 December 2017.

Indicator	Dir	EU 1Y lag Signals	EU 1Y lag Prob models	EU 2Y lag Signals	EU 2Y lag Prob models	EU 3Y lag Signals	EU 3Y lag Prob models	EA 1Y lag Signals	EA 1Y lag Prob models	EA 2Y lag Signals	EA 2Y lag Prob models	EA 3Y lag Signals	EA 3Y lag Prob models	non-EA 1Y lag Signals	non-EA 1Y lag Prob models	non-EA 2Y lag Signals	non-EA 2Y lag Prob models	non-EA 3Y lag Signals	non-EA 3Y lag Prob models
External Sector Indicators																			
Current account balance - % of GDP, 3 years average	UP	3	3	3	1	3	3	3	3	4	3	4	3	2	2	2	2	2	4
	DOWN	3		2		2		2		1		1		4		3		3	
Real effective exchange rate, 42 trading partners - 3 years % change	UP	4	3	4	3	4	3	4	4	4	3	4	1	3	4	3	3	4	3
	DOWN	2		2		2		3		2		3		2		1		1	
Export market shares - 5 years % change		1	2	1	3	1	3	1	1	2	4	2	3	1	4	2	4	1	4
Nominal unit labour cost index - 3 years % change		3	4	3	1	2	1	3	4	3	3	2	2	3	2	3	1	1	3
Net international investment position - % of GDP		2	4	2	4	1	4	2	3	1	3	1	3	3	2	3	3	3	4
Credit and Debt Indicators																			
Private sector credit flow, consolidated - % of GDP		4	4	4	3	3	3	4	4	3	1	3	1	4	3	4	4	3	4
Private sector debt, consolidated - % of GDP		1	4	1	4	1	3	1	4	1	2	1	3	1	3	1	4	1	2
General government sector debt - % of GDP		2	3	3	4	4	3	3	3	3	3	4	3	2	3	2	4	3	3
Total financial sector liabilities, non-consolidated - 1 year % change		4	4	4	4	3	4	4	3	4	4	3	4	4	3	4	4	4	4
House price index, deflated - 1 year % change		4	1	4	2	4	3	4	1	4	1	4	4	4	1	4	3	4	4
Labor Market Indicators																			
Activity rate (15-64 years) - % point change (t, t-3)		2	3	2	3	3	3	2	2	2	4	2	4	2	3	2	3	2	4
Long-term unemployment rate - % of active population in the same age group, % point change (t, t-3)		1	3	1	3	2	2	1	2	2	2	2	4	1	4	1	3	2	4
Youth unemployment rate - % of active population in the same age group, % point change (t, t-3)		1	4	1	3	1	1	1	3	1	4	1	3	1	4	1	4	2	4
Unemployment rate - 3 years average		3	2	3	4	4	4	2	3	3	3	3	4	3	3	4	2	4	1

Note: The ranking of headline MIP indicators ranges from 1 (best outcome) to 4 (worst outcome / no contribution to the EWS)